

# **AIR FORCE QUALIFICATION TRAINING PACKAGE (AFQTP)**



for  
**ELECTRICAL SYSTEMS**  
(3E0X1)

**MODULE 11**  
**AFS SPECIFIC PUBLICATIONS**

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## MODULE 11

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Career Field Education and Training Plan (CFETP) references from 1 Apr 97 version.

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**AIR FORCE QUALIFICATION TRAINING PACKAGES (AFQTPs)**  
**For**  
**ELECTRICAL SYSTEMS**  
**(3E0X1)**

**INTRODUCTION**

*Before starting this AFQTP*, refer to and read the “Trainee/Trainer Guide” located on the AFCESA Web site <http://www.afcesa.af.mil/>. This guide will be found at each AFS’s AFQTP download page.

*AFQTPs are mandatory and must be completed* to fulfill task knowledge requirements on core and diamond tasks for upgrade training. *It is important for the trainer and trainee to understand* that an AFQTP does not replace hands-on training, nor will completion of an AFQTP meet the requirement for core task certification. AFQTPs will be used in conjunction with applicable technical references and hands-on training.

*AFQTPs and Certification and Testing (CerTest) must be used as minimum upgrade requirements for Diamond tasks.*

**MANDATORY minimum upgrade requirements:**

***Core task:***

- AFQTP completion
- Hands-on certification using the included Performance Checklist

***Diamond task:***

- AFQTP completion
- CerTest completion (80% minimum to pass)

**Note:** *Trainees will receive hands-on certification training using the included Performance Checklist when equipment becomes available either at home station or at a TDY location.*

***Put this package to use.*** Subject matter experts under the direction and guidance of HQ AFCESA/CEOT revised this AFQTP. If you have any recommendations for improving this document, please contact the Electrical Career Field Manager at the address below.

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## LOCATE DESIRED INFORMATION IN:

MODULE 11

AFQTP UNIT 2

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STANDARD PUBLICATIONS (11.2.1.)

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**STANDARD PUBLICATIONS*****Task Training Guide***

<b>STS Reference Number/Title:</b>	11.2.1. AFS Specific publications, locate desired information in standard publications
<b>Training References:</b>	<ul style="list-style-type: none"><li>• CDC 3E051 Set A Vol. 1</li></ul>
<b>Prerequisites:</b>	<ul style="list-style-type: none"><li>• Possess as a minimum a 3E031 AFSC.</li></ul>
<b>Equipment/Tools Required:</b>	<ul style="list-style-type: none"><li>• Air Force Index 2 (AFIND 2)</li></ul>
<b>Learning Objective:</b>	<ul style="list-style-type: none"><li>• Given a standard publication, locate desired information.</li></ul>
<b>Samples of Behavior:</b>	<ul style="list-style-type: none"><li>• Following approved steps, locate desired information</li></ul>

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## STANDARD PUBLICATIONS

**Background:** Publications can be in paper, microfilm, or digital form. A digital publication is one that primarily resides on automated media, rather than paper. These media include magnetic tape, magnetic disks, optical disks, and bulletin boards.

This type of publication may contain computational software that enables users to do programmatic work. Users need only selected portions to do tasks pertaining to the section at hand. Offices of primary responsibility (OPR) of digital publications must generate a paper copy for the record set and must generate the entire publication on paper on request.

The Air Force Electronic Publications Library (AFEPL) of departmental publications and forms is available on CD-ROM for all Air Force personnel to use. All you need is a personal computer that has CD-ROM capability. The AFEPL lets you look up information without going anywhere else or having to request a copy of a publication through normal, time-consuming channels. If you have a printer nearby, you can print from the publication. The ease of reference is the outstanding feature of the AFEPL. This CD-ROM disk is put out for distribution every 3 to 4 months.

*To perform the task, follow these steps:*

### Step 1: Looking up publications.

- Let's suppose that your supervisor wants you to research safe clearance responsibilities. You already know that anything that has to do with electrical power systems comes under "Civil Engineering" in relation to subject matter.
- Just as telephone systems will come under "Communications," so will power production, plumbing, and heat, and so forth, come under "Civil Engineering".

### Step 2: Procedure.

- Since you are looking for *procedural guidance* for implementing policy in the field, your first place to look would be under AFIs.
- Looking at the front cover of your latest copy of AFIND 2, you see that all AFIs are in Section C.
- AFIs are listed starting with all those that begin with series number 10-"Operations".
- Skip through all the following pages until you get to series 32-"Civil Engineering".
- Briefly scan all of the AFIs listed under "Civil Engineering" until you see the one you want-AFI 32-1064, "*Electrical Safe Practices*".
- Scan through the table of contents until you find Section 4 "Safe Clearance Requirement".
- Once you locate Section 4 it is just a matter of locating whose responsibility you want in section 4.1.1. (See Figure 1.)

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#### 4.1. Safe Clearance Responsibilities:

4.1.1. The safe clearance manager designated by the Base Civil Engineering Operations Flight Commander will issue a safe clearance as required. The safe clearance manager arranges for interruption of service and must have full knowledge of the base distribution system. This person must also notify the utility company supplying power to the installation before any operation, which may affect the utility company's system. The safe clearance manager will issue safe clearances to the supervisor responsible for exterior electrical systems. Usually, he will issue only one safe clearance, however, if some distance separates the various crews or the task areas when two or more crews are working, he may issue as many safe clearances as necessary. In such cases the exterior electric supervisor must act as coordinator of all the issued safe clearances. The exterior electrical supervisor releases the safe clearance to the safe clearance manager after the work is complete. The supervisor ensures all personnel and temporary grounds are clear, and the line or equipment is ready for service. However, in the absence of the supervisor, issue the safe clearance only to authorized personnel on a list maintained by the infrastructure support element supervisor. The safe clearance manager accepts and approves the release. If the safe clearance manager issues more than one safe clearance, then the manager ensures all clearances are released and accepted before any change is made in the blocking and tagging to put the line or equipment back in service.

**Figure 1, Safe Clearance Responsibilities**

**Review Questions  
for  
Standard Publications**

<b>Question</b>	<b>Answer</b>
1. The Air Force Electronic Publications Library (AFEPL) of departmental publications and forms is available on CD-ROM for all Air Force personnel to use.	a. True b. False
2. When looking for <i>procedural guidance</i> for implementing policy in the field, your first place to look would be under ____.	a. Air Force Regulations. b. Shop Policies. c. Air Force Instructions. d. Technical Orders.
3. Publications can be in ____.	a. Paper. b. Microfilm. c. Digital form. d. All of the above.

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## STANDARD PUBLICATIONS

Performance Checklist		
Step	Yes	No
1. Given a standard publication can trainee locate desired information?		

**FEEDBACK:** Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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**LOCATE DESIRED INFORMATION IN:**

**MODULE 11**

**AFQTP UNIT 2**

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**TECHNICAL ORDERS (11.2.2.)**

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## TECHNICAL ORDERS

### *Task Training Guide*

<b>STS Reference Number/Title:</b>	11.2.2. AFS Specific publications, locate desired information in technical orders.
<b>Training References:</b>	<ul style="list-style-type: none"><li>• CDC 3E0X1 Set A Vol. 1</li><li>• CD-ROM AFS Specific Publications, 3E0X2-11C</li></ul>
<b>Prerequisites:</b>	<ul style="list-style-type: none"><li>• Possess as a minimum a 3E031 AFSC.</li></ul>
<b>Equipment/Tools Required:</b>	<ul style="list-style-type: none"><li>• Technical Order</li></ul>
<b>Learning Objective:</b>	<ul style="list-style-type: none"><li>• Given a technical order, locate desired information</li></ul>
<b>Samples of Behavior:</b>	<ul style="list-style-type: none"><li>• Following approved steps, locate desired information.</li></ul>

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## TECHNICAL ORDERS

**Background:** If you personally owned billions of dollars of high-tech equipment and all of this equipment were operated and maintained by thousands of people on a daily basis, you would want to be sure that everybody using your equipment did so in a way that was standard throughout your organization. Additionally, you would want people to follow standard, prescribed procedures with your equipment so that it would not injure people or get damaged unnecessarily. So does the Air Force! This is why you need to know what the TO system is all about, how to use it, and how to improve it. The correct operation and maintenance of Air Force equipment depends on you.

Technical manuals are perhaps the most important types of technical orders to the craftsman or journeyman. They contain the detailed instructions required for the operation, use, maintenance, inspection, installation, and overhaul of equipment. For some miscellaneous equipment, usually shop or ground equipment, it is not practical or economical for the Air Force to publish a technical order. Instead, commercial technical manuals are used and serve the same purpose as an Air Force technical order. Generally, TOs are published for all items of equipment managed by the Air Force Materiel Command (AFMC).

Much information used by the Air Force is found in TOs. Therefore, you need a procedure that ensures finding the right TO number and title so that you can use this information. TO numbers and titles are found in the TO indexes. There are two basic types of indexes: **numerical** and **alphabetical**.

*To accomplish this lesson, complete AFQTP 3E0X2-11C Version 1.0 AFS Specific Publications CD-ROM.*

**NOTE:** In the CD-ROM there are tests after each lesson. After completion of all the lessons you may see your Unit Education and Training Manager to take the following optional Certtest:

**Test no.**  
**8085**

**Title**  
**Technical Order**

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## TECHNICAL ORDERS

Performance Checklist		
Step	Yes	No
1. Given a Technical Order can trainee locate desired information?		
2. Can trainee locate Technical Orders within their duty section?		
3. Can trainee locate part numbers from assembly diagrams?		

**FEEDBACK:** Trainer should provide both positive and/or negative feedback to the trainee immediately after the task is performed. This will ensure the issue is still fresh in the mind of both the trainee and trainer.

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## LOCATE DESIRED INFORMATION IN:

MODULE 11

AFQTP UNIT 2

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NATIONAL ELECTRICAL CODE (NFPA 70) (11.2.3.)

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**NATIONAL ELECTRICAL CODE (NFPA 70)*****Task Training Guide***

<b>STS Reference Number/Title:</b>	11.2.3. – AFS Specific publications, locate desired information in National Electrical Code (NFPA 70)
<b>Training References:</b>	<ul style="list-style-type: none"><li>• National Electrical Code (NEC)</li></ul>
<b>Prerequisites:</b>	<ul style="list-style-type: none"><li>• Possess as a minimum a 3E031 AFSC.</li></ul>
<b>Equipment/Tools Required:</b>	<ul style="list-style-type: none"><li>• National Electrical Code</li></ul>
<b>Learning Objective:</b>	<ul style="list-style-type: none"><li>• Given an NEC, locate desired information</li></ul>
<b>Samples of Behavior:</b>	<ul style="list-style-type: none"><li>• Following approved steps, locate desired information in the NEC</li></ul>

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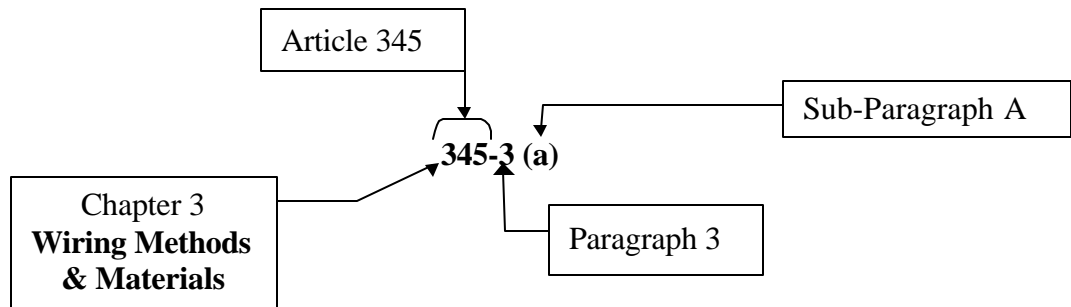
## NATIONAL ELECTRICAL CODE (NFPA 70)

**Background:** The National Electrical Code (NEC) is a commercial publication used by electricians and inspectors to maintain a minimum level of safety. The NEC is sponsored by the National Fire Protection Association (NFPA) and is printed every three years. The Air Force uses the NEC plus their regulations to set the standards required for wiring on military bases.

The NEC is divided into Chapters, Articles, and Paragraphs. Each Chapter covers specific areas of electrical safety and the minimum standards for those particular areas. (See Article 90-3)

The NEC contains the Introduction and nine chapters. Chapters one through four deal with general wiring methods. Chapters five, six, and seven pertain to special systems and conditions; eight covers communications systems and nine has tables and examples. All the information given within these chapters are considered minimum safety standards for electrical installations.

Chapters are divided into Articles. The articles are identified by numbers. The first number references the Chapter in which the Article is located. For example, Article 345-3(a) covers the code's permission to use Intermediate Metal Conduit under all atmospheric conditions. The breakdown of this Article is as follows:



In addition, Fine Print Notes (FPN) are used to clarify certain paragraphs. If used, they will be located at the end of the paragraph.

As in any text, the Table of Contents is located in the front. It provides the reader with a brief layout of the text. This table lists information by Chapter, Article number and name, as well as by page number. The Table of Contents is a broad description of the text. For a detailed breakdown of the codes refer to the text.

The index is a detailed listing of alphabetically arranged information. The index refers you to the Article as well as the paragraph in which the information is contained. This information is sometimes cross-referenced within the Index. Although the Index is located in the rear of the book, it should be used first.

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*To perform the task, follow these steps:*

**Step 1: Determine the topic.**

- Decide on the topic you want to locate information on.
- For example, you need information on clearances for service drops over driveways.

**Step 2: Locate in Index.**

- Go to the Index located in the back of the NEC and alphabetically locate that topic.
- For example, service drop clearances are located in Article 230-24.

**Step 3: Locate the Article.**

- Go to the Chapter (Example: Chapter 2).
- Find the Article (Article 230).
- Go to the paragraph referenced (Paragraph 24).
- Read the information you need (Clearance must be 12 feet).

**NOTE:**

If you have any difficulties with any terms used in the NEC refer to Article 100, which covers definitions used in the code. Be aware of any noted acceptions in paragraphs.

**Review Questions**  
**for**  
**National Electrical Code (NFPA 70)**

Question	Answer
1. The NEC is printed every ____ years.	a. 1 b. 2 c. 3 d. 4
2. Chapter eight of the NEC covers what areas?	a. Tables and examples b. General wiring c. Special systems and conditions d. Communication systems
3. The Table of Contents is a detailed listing of alphabetically arranged information.	a. True b. False
4. _____ of the NEC covers definitions used in the code.	a. Article 90-3 b. Article 100 c. Table of Contents d. Index

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## NATIONAL ELECTRICAL CODE (NFPA 70)

Performance Checklist		
Step	Yes	No
1. Did the trainee alphabetically locate the topic in the Index?		
2. Did the trainee find the article referenced in the Index?		
3. Did the trainee find the information in the article?		

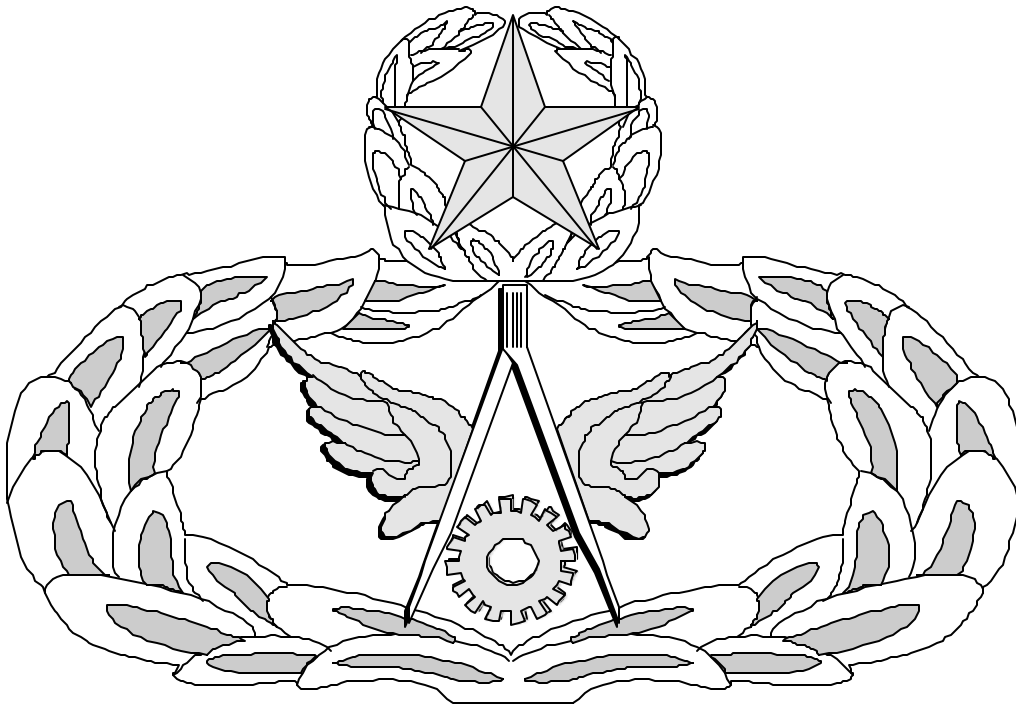
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# Air Force Civil Engineer

## QUALIFICATION TRAINING PACKAGE (QTP)

### REVIEW ANSWER KEY



For  
ELECTRICAL SYSTEMS

(3E0X1)

MODULE 11

AFS SPECIFIC PUBLICATIONS

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**Key-1**

## STANDARD PUBLICATIONS

(3E0X1-11.2.1.)

Question	Answer
1. The Air Force Electronic Publications Library (AFEPL) of departmental publications and forms is available on CD-ROM for all Air Force personnel to use	a. True
2. When looking for <i>procedural guidance</i> for implementing policy in the field, your first place to look would be under _____.	c. Air Force Instructions
3. Publications can be in _____.	d. All of the above

## NATIONAL ELECTRICAL CODE (NFPA 70)

(3E0X1-11.2.3.)

Question	Answer
1. The NEC is printed every _____ years.	c. 3
2. Chapter eight of the NEC covers what areas?	d. Communication systems
3. The Table of Contents is a detailed listing of alphabetically arranged information.	b. False
4. _____ of the NEC covers definitions used in the code.	b. Article 100

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